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ANALOG SIGNAL DISPLAY Q-DISP-T

USER's MANUAL

The displays Q-DISP-T, prepared for mounting on the back panel, 96x48mm, will allow you to view RTD and TC value.

It is possible to have a high power or low voltage AC / DC supply and have up to three configurable outputs of relay outputs and analog outputs

Q-DISP-T-x-x-x-x

Q-DISP-T-L (Low Voltage Supply)
Q-DISP-T-H (High Voltage Supply)

Q-DISP-T-x-R (n°1 Relay output)
Q-DISP-T-x-R-R (n°2 Relays output)
Q-DISP-T-x-R-R-R (n°3 Relays output)
Q-DISP-T-x-AO (n°1 Analog Output)
Q-DISP-T-x-AO-R (n°1 AO, n°1 Relay)
Q-DISP-T-x-AO-R-R (n°1AO, n°2 Relays)
Q-DISP-T-x-AO-AO (n°2 AO)
Q-DISP-T-x-AO-AO-R (n°2 AO, n°1 Relay)
Q-DISP-T-x-AO-AO-AO (n°3 AO)

Q-DISP-T ANALOG SIGNAL DISPLAY

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1. Meter Q-DISP-T

Panel meter 96x48mm size for Pt100/RTD and thermocouples

Panel meter for temperature signals, accepts Pt100/RTD with 2 and 3 wires, and thermocouples J, K, T, E, S, R, N, C, L and X. Temperature display in degrees celsius (ºC) or fahrenheit (ºF). Thermocouple cold junction compensation selectable. Manual offset selectable. Selectable behavior for alarms in case of sensor break ('to_high' or 'to_low').

Instrument with 96x48mm standard DIN size. Resolution 4 digits plus negative sign.

Management for up to 3 alarms with 1 or 2 setpoints each alarm, with hysteresis and delays. Provides memory for maximum and minimum, display on selectable steps, password and selectable levels of brightness.

Power options with universal AC and DC ranges, and space for 3 additional control and/or signal retransmission modules.

Standard IP54 front protection, with optional upgrade to IP65 protection.

Connections via plug-in screw terminals and configuration via three front push-buttons. For application on industrial environments.

1.1 Order reference

	Model	Power	Option1	Option2	Option3
Q-DISP -	**T** -	**H** -	**---** -	**---** -	**---**
		-H *(85-265 Vac/dc)*	-R *(1 relay)*	-R *(1 relay)*	-R *(1 relay)*
		-L *(11-60 Vdc and 24/48 Vac)*	-AO *(Analogue output)*	-AO *(Analogue output)*	-AO *(Analogue output)*
			- *(empty)*	- *(empty)*	- *(empty)*

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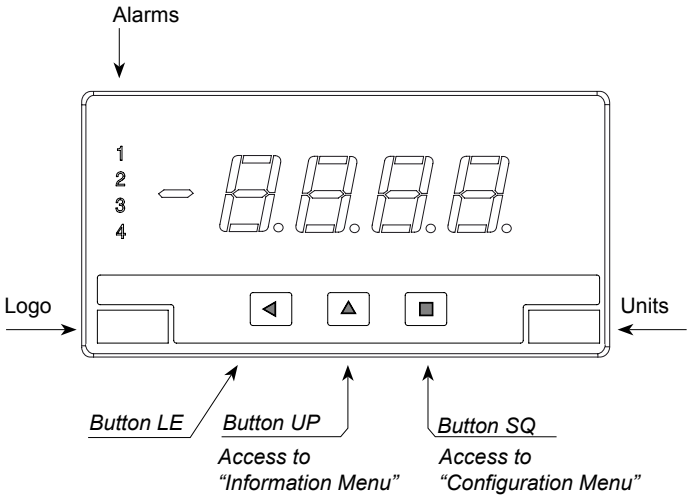
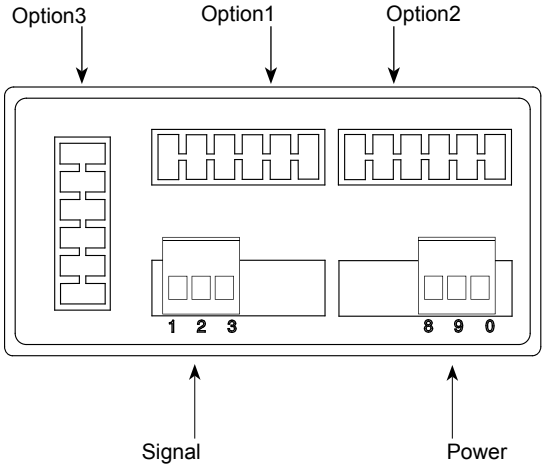
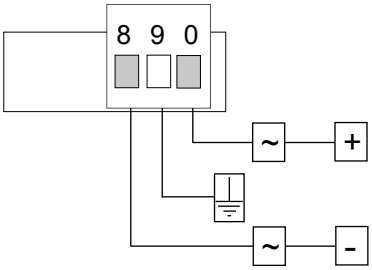
1.2 Front View



1.3 Rear View



1.4 Power Connections



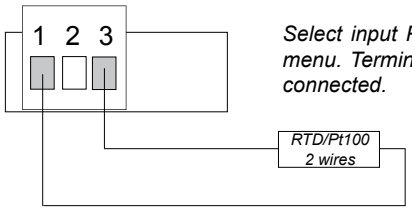
Earth connection - Although a terminal is offered for earth connection, the connection is optional. The instrument does not need this connection for correct functioning nor for compliance with the security regulations.

Fuse - To comply with security regulation 61010-1, add to the power line a protection fuse acting as disconnection element, easily accessible to the operator and identified as a protection device.

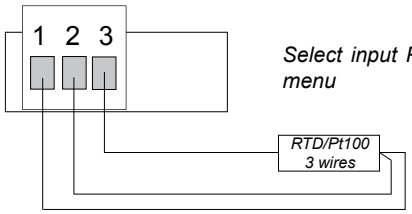
Power "H"	fuse 250mA time-lag
Power "L"	fuse 400mA time-lag

1.5 Signal connections - Pt100 / RTD

Measure can be selected for 2 or 3 wire systems.



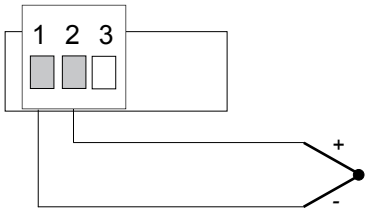
Select input Pt100 2Wires in the menu. Terminal 2 can be left un-connected.



Select input Pt100 3Wires in the menu

1.6 Signal connections - Thermocouples

To configure, select the appropriate thermocouple type in the configuration menu.



1.7 Technical data

Digits	4
Type	7 segments, red
Height	14 mm
Display maximum	9999
Display minimum	-9999
Decimal point	selectable 8.8.8.8.
Overrange	9999 flashing
Underrange	-9999 flashing
Signals accepted	Pt100/RTD and Thermocouples
Temperature scale	ITS90
Display units	ºC or ºF, selectable

Thermocouple data

Thermocouples accepted	J, K, T, E, S, R, N, C, L, X
(Thermocouple X is a linear 10uV/ºC signal)	
Resolution	1º
Ranges	see table 3
Max. error at 25ºC	see table 3
Offset drift	see table 3
Span drift*	see table 3
**Note - span drift includes also the offset drift*	
CJC	automatic ("On"/"Off" selectable)
CJC accuracy	<1.0ºC
CJC thermal drift	<0.04º/ºC
On sensor break	"to_high" or "to_low", selectable
Acquisitions	3 acquisitions / second

Pt100/RTD data

Sensors accepted	2 or 3 wire, selectable
Resolution	1º or 0.1º, selectable
Ranges	see table 3
Alpha	Alpha385 or Alpha390, selectable
Max. error at 25ºC	see table 3

1.7 Technical data (cont.)

Offset drift	see table 3
Span drift *	see table 3
**Note - span drift includes also the offset drift*	
Cable compensation	up to 14 Ohm
Compensation accuracy	<0.02ºC / Ohm
Acquisitions	4 acquisitions / second

Power

Power "H"	85 to 265 Vac/dc
Power "L"	11 to 60 Vdc and 24/48Vac
Consumption	<4W
Isolation	3500Veff for power "H" 2000Veff for power "L" all levels tested for 60 seconds

Configuration	3 frontal push buttons

Functions available

Steps	yes, configurable
Memory of maximum	yes
Memory of minimum	yes
Password	yes, configurable
Double setpoints	yes
Brightness control	yes, 5 levels
Optional boards	3 free slots

Mechanical

Mounting	panel
Connections	plug-in screw terminals
Weight	<150 grams
Housing materials	ABS, polycarbonate
Front size	96x48mm
Panel cut-out	92x44mm
Deep from panel	91mm (including terminal)

Type	*Range ºC*	*Max. error at 25ºC**	*Range ºF*	*Offset drift*	*Span drift* *includes offset drift*
Pt100/RTD	*800 / -200 ºC*	*<0.2ºC*	*1562 / -328 ºF*	*0.05º/ºC*	*0.10º/ºC*
Thermocouple J	*1200 / -200 ºC*	*<2ºC*	*2192 / -328 ºF*	*0.05º/ºC*	*0.20º/ºC*
Thermocouple K	*1372 / -200 ºC*	*<2ºC*	*2372 / -328 ºF*	*0.05º/ºC*	*0.20º/ºC*
Thermocouple T	*400 / -200 ºC*	*<2ºC*	*752 / -328 ºF*	*0.02º/ºC*	*0.02º/ºC*
Thermocouple E	*1000 / -200 ºC*	*<2ºC*	*1832 / -328 ºF*	*0.05º/ºC*	*0.20º/ºC*
Thermocouple S	*1768 / -50 ºC*	*<4ºC*	*2282 / -58 ºF*	*0.20º/ºC*	*0.20º/ºC*
Thermocouple R	*1600 / -50 ºC*	*<4ºC*	*2912 / -58 ºF*	*0.20º/ºC*	*0.20º/ºC*
Thermocouple N	*1300 / -200 ºC*	*<2ºC*	*2372 / -328 ºF*	*0.05º/ºC*	*0.20º/ºC*
Thermocouple C	*2320 / 0 ºC*	*<2ºC*	*4192 / 32 ºF*	*0.02º/ºC*	*0.02º/ºC*
Thermocouple L	*900 / -200 ºC*	*<2ºC*	*1652 / -328 ºF*	*0.05º/ºC*	*0.20º/ºC*
Thermocouple X	*4000 / -200 ºC*	*<2ºC*	*7232 / -328 ºF*	*0.02º/ºC*	*0.02º/ºC*

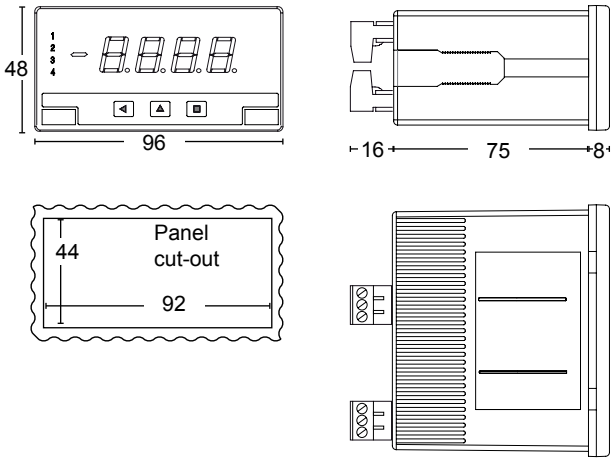
Table 3 - Thermocouple and PT100/RTD specifications

1.7 Technical data (cont.)

Protection IP54 standard
IP65 optional (Front sealed. Opening the front breaks the seal)

Temperature Operation 0 to 50ºC
Temperature Storage –20 to +70ºC
Warm-up 15 minutes

1.8 Mechanical dimensions (mm)



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1.9 Operating the menus

The instrument has two menus accessible to the user :

"*Configuration Menu"* (key SQ)
"*Information Menu"* (key UP)

The *"Configuration Menu"* allows to change the configuration of the instrument. Access to the *"Configuration Menu"* can be password protected with the function "*PASSWORD*". During operation with the *"Configuration Menu"* the alarms are kept "*on-hold*". When leaving the *"Configuration Menu"* the instrument performs a restart, and new configuration is applied. On restart of the instrument, also the control output modules are restarted (relays, analogue outputs, ...).

The *"Information Menu"* is for information only, and it does not accept changes on the displayed information. To enter the *"Information Menu"* press the "*UP*" button. It is not affected by the "PASSWORD" function. Leaving the *"Information Menu"* returns to the measuring state of the instrument, without restart of the unit.

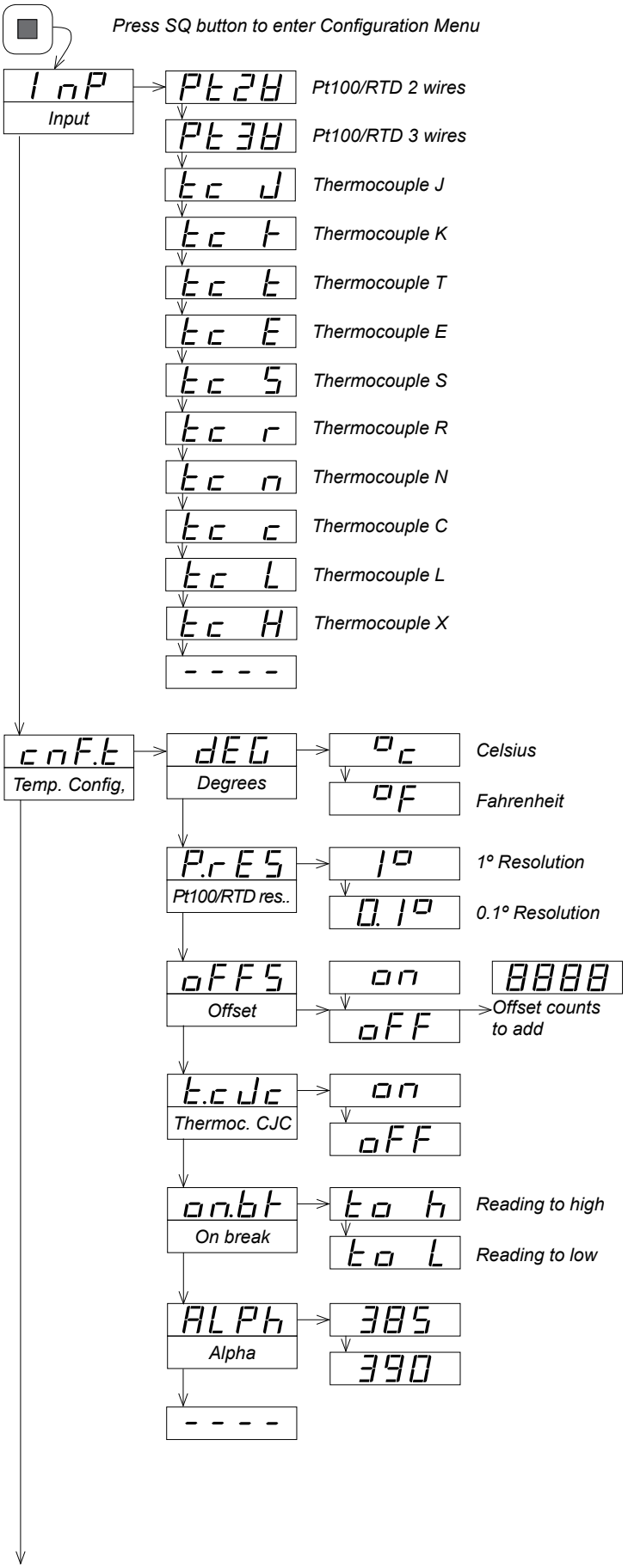
Rollback - After 30 seconds without interaction from the operator, the instrument leaves the menu and returns to the previous working mode. In case of configuration menu, all changes are discarded.

Button SQ - Selects the menu entry currently displayed. When entering a numeric value (for example a setpoint value) validates the value on display.

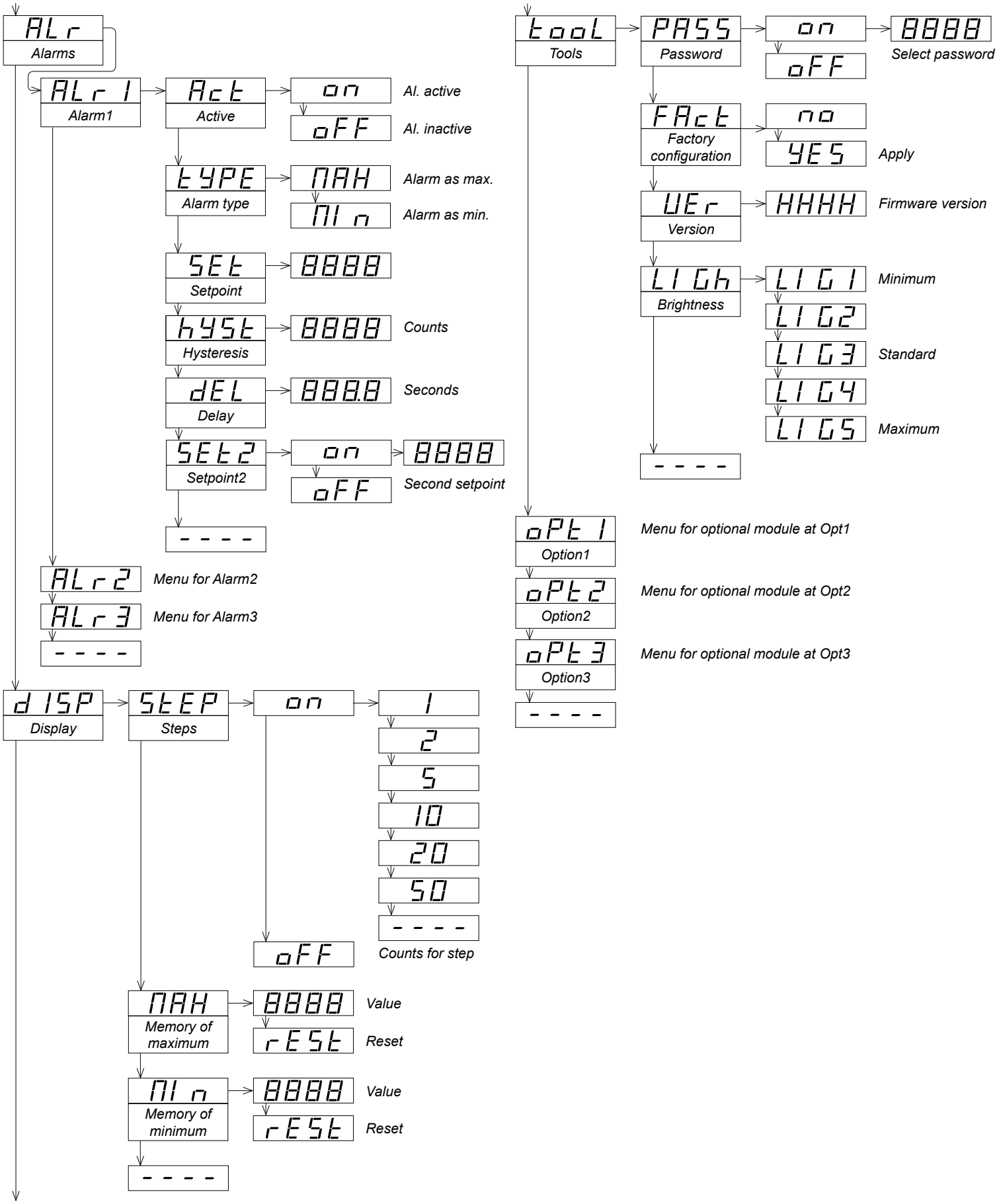
Button UP - Moves vertically on the menu entries. When entering a numeric value (for example a setpoint value) modifies the current digit by increasing its value up from 0 to 1, 2, 3, 4, 5, 6, 7, 8, 9.

Button LE - Leaves the current menu. Pressing LE several times will leave all menus. When leaving all menus in the configuration menu, changes will be saved . When entering a numeric value (for example a setpoint value) it moves from one digit to the next. Each digit value can then be modified with the UP button.

1.10 Configuration menu



1.10 Configuration menu (cont.)



1.10.1 Input menu

The input menu selects the input signal range. Options available are Pt100/RTD 2 or 3 wires, and thermocouples J, K, T, E, S, R, N, C, L and X.

Note - Thermocouple X is a linear signal at 10uV/ºC.

1.10.2 Temperature configuration

The temperature configuration menu sets the function parameters for Pt100/RTD and thermocouple sensors.

Degrees (DEG) - Value "ºC/ºF". Select the temperature to be displayed in celsius or fahrenheit degrees.

Pt100/RTD resolution (P.RES) - Value "1º/0.1º". Resolution for the Pt100/RTD. Select to display with degree or tenth of degree resolution.

Offset (OFFS) - Value from "-9999" to "9999" counts. Offset to be added to the reading. Both for Pt100/RTD and thermocouples.

Thermocouple Cold Junction Compensation (T.CJC) - Value "On/Off". Select "On" for automatic CJC compensation in the instrument. Select "Off" to disable the CJC compensation.

On break (ON.BK) - Value "to_h/to_l". Select "To L" to make the reading go to minimum, in case of probe broken. Select "To H" to make the reading go to maximum in case of probe broken.

Alpha (ALPH) - Value "385/390". Select "385" or "390" according to your Pt100/RTD sensor.

1.10.3 Alarms

The instrument can manage up to 3 alarms. These alarms control optional relays R (see section 2.1) which can be installed at slots Opt1, Opt2 and Opt3. More alarms can be achieved by installing special control modules R2, R4 and R6. Configuration menus for special modules are not listed in this document.

Active (ACT) - Value "ON/OFF". Defines if the instrument has to manage this alarm or not. Select "OFF" for alarm not managed.

Type (TYPE) - Value "MAX/MIN". Defines the behavior of the alarm as maximum or minimum alarm. The alarms configured as maximum are activated when the display value is equal or higher than the setpoint. The alarms configured as maximum are deactivated when the display is lower than the setpoint. The alarms configured as minimum have the inverse behavior.

Setpoint (SET) - Value from "9999" to "-1999". Alarm set point.

Hysteresis (HYSt) - Value from "0" to "9999". Points of hysteresis. The hysteresis applies on the deactivation of the alarm.

Delay (DEL) - Value from "0.0" to "99.9" seconds. Delay to be applied to the relay activation and deactivation. Relays are activated and deactivated X seconds after the activation / deactivation of the alarm. The delay affects only to the relays. The delay does not affect to the front leds.

Setpoint2 (SET2) - Value from "-1999" to "9999". Second setpoint. The second setpoint allows for the creation of activation windows. If the alarm is configured as maximum with setpoint 1000 and setpoint2 is configured at 1500, the alarm will be activated between 1000 and 1500 and the alarm will be deactivated when display is <1000 and >1500. Setpoint2 is affected on the same way as the setpoint with hysteresis and delays.

1.10.4 Display

Functions on this menu allow for configuration of the visualization.

Steps (STEP) - Display changes on predefined steps. Values are 1, 2, 5, 10, 20 and 50. The display is made in steps of X counts. For example, select a step of 20 will make the display to change in steps of 20 (1420, 1440, 1460, ...).

Maximum (MAX) - Memory of maximum display. Indicates the maximum value of display since the last reset of the memory. Memory is reset on the following cases : manual reset from the Configuration Menu (Maximum), change on the input signal (Input), modification on the scaling (Scaling), change on the decimal point (dP), modification of the linearization segments, or instrument power-down.

Minimum (MIN) - Memory of minimum display. Indicates the minimum value of display since the last reset of the memory. Memory is reset on the following cases : manual reset from the Configuration Menu (minimum), change on the input signal (Input), modification on the scaling (Scaling), change on the decimal point (dP), modification of the linearization segments, or instrument power-down.

1.10.5 Tools

Password (PASS) - Select a number to act as password. This password will be requested when entering the Configuration Menu. To deactivate the password select "Off".

Factory Settings (FACT) - Factory default configuration. Select "yES" to activate the factory default configuration.

Version (VER) - Firmware version installed.

Light (LIGH) - Luminosity. Select between 5 predefined levels of luminosity.

1.10.6 Menu OptX - Options

Menu options OPT1, OPT2 and OPT3 give access to the configuration menus of the options installed at slots Opt1, Opt2 and Opt3. This menu depends on the installed option. If there is no option installed the instrument shows "*NONE*". Control modules R are controlled from the standard alarm menu (see section 1.12.7).

1.11 Default factory configuration

Sensor	Pt100 2Wire
Degrees	ºC
Resolution	0.1º
Offset	0
On Break	To high
Alpha	385
Alarms 1,2 and 3	
Active	Off (not managed)
Type	maximum
Setpoint	1000
Hysteresis	0 counts
Delay	0.0 seconds
Setpoint2	Off
Display	
Steps	Off
Memory of maximum	-9999
Memory of minimum	9999
Tools	
Password	Off
Brightness	3

1.12 Messages and errors

When the instrument detects that the displayed value does not correspond to the input value, the display will flash and alternate with a message.

"**h.udr**" Hardware underrange. The thermocouple signal is lower than minimum readable signal (-30mV).

"**h.oVr**" Hardware overrange. The thermocouple signal is higher than maximum readable signal (80mV).

"**d.udr**" Display underrange. The Pt100/RTD is shortcircuited.

"**hoLd**" The instrument is showing the value present when the hold function was activated. Hold function is active.

"**Min**" The instrument displays the minimum displayed value in memory. The minimum visualization is active.

"**MAX**" The instrument displays the maximum displayed value in memory. The maximum visualization is active.

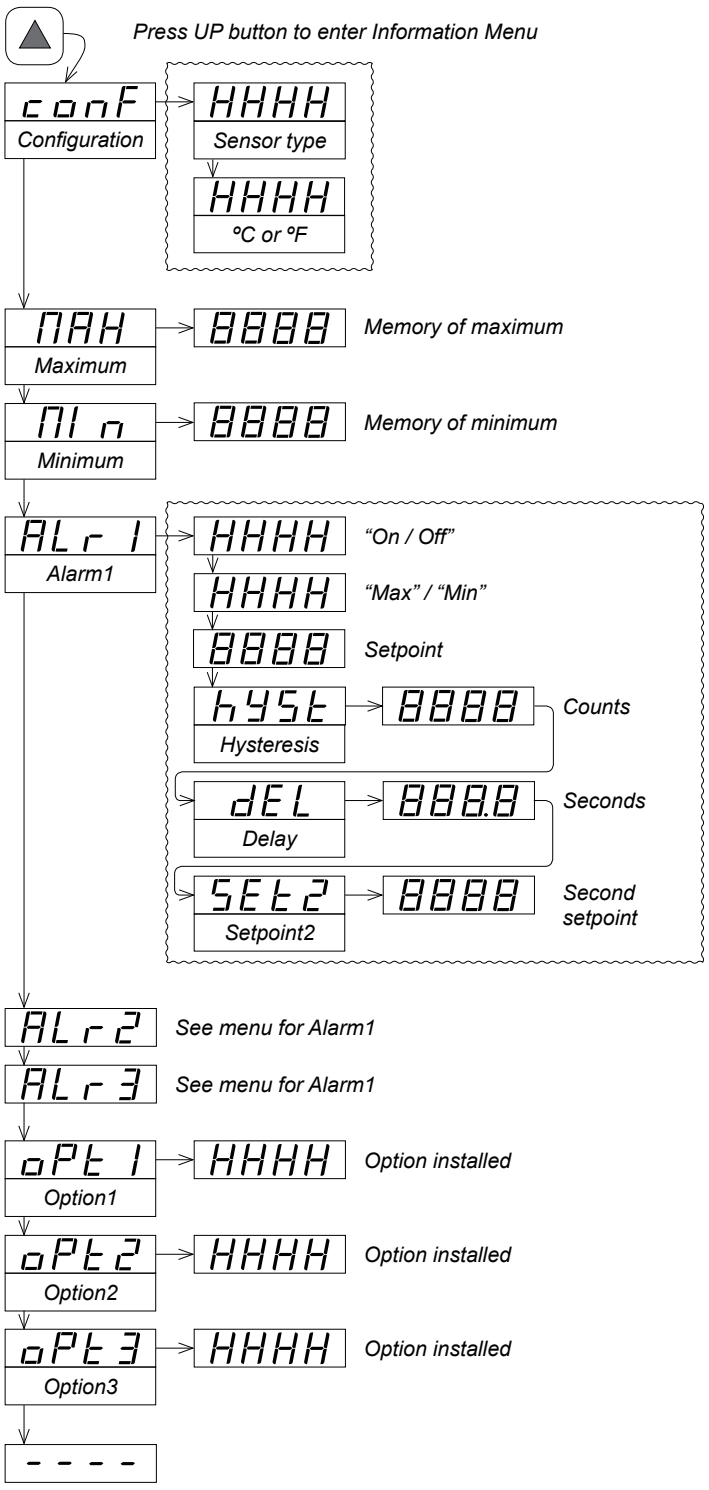
"**brk**" The instrument displays "brk" with either "9999" or "-9999" when : 1) resistance measured is higher than 390 Ohms (higher than 850ºC for PT100/RTD measure), or 2) in case the third wire ohm is higher than 15 Ohm, or 3) thermocouple measure is open circuit.

"**Err.1**" Password incorrect.

"**Err.2**" The instrument has detected an installed option but was unable to communicate.

"**E.101**" Option is installed but the type can not be recognized.

1.13 Information menu



1.13.1 Information menu

Configuration (Conf) - Information on the configured input sensor and the degrees selected.

Maximum (MAX) - Value of the maximum display.

Minimum (Mln) - Value of the minimum display.

AlarmX (ALX) - Configuration of alarm X. The sequence of information shows if the alarm is being managed ("On/Off"), the alarm type ("Max/Min"), the setpoint, the hysteresis value, the activation delay and the value of setpoint2 ("Off" or the setpoint2 value).

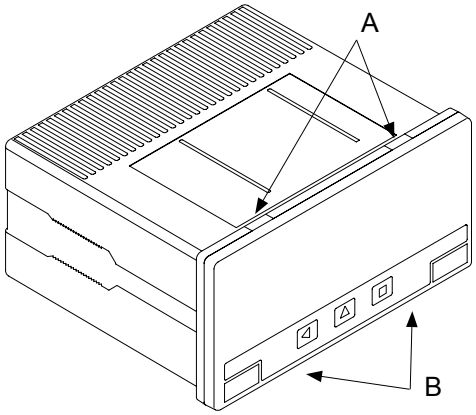
OptionX (OptX) - Type of module installed. If there is no module shows "nonE".

1.14 Accessing the instrument

You may need to access the inside of the instrument to insert additional modules. Use a flat screwdriver to unlock the upper clips marked with "A". Then unlock the lower clips marked with "B" and move out the front filter. Let the inside of the instrument slide out of the housing.

To reinsert the instrument make sure that all modules are correctly connected to the pins on the display module. Place all the set into the housing, assuring that the modules correctly fit into the internal guiding slides of the housing. Once introduced, place again the front filter by clipping first the upper clips "A" and then the lower clips "B".

Important - If your instrument was delivered with the IP65 front seal option, accessing the inside of the instrument will permanently break the IP65 seal on the areas of clips "A" and "B".



1.15 Warranty

All instruments are warranted against all manufacturing defects for a period of 24 MONTHS from the shipment date. This warranty does not apply in case of misuse, accident or manipulation by non-authorized personnel. In case of malfunction get in contact with your local provider to arrange for repair. Within the warranty period and after examination by the manufacturer, the unit will be repaired or substituted when found to be defective. The scope of this warranty is limited to the repair cost of the instrument, not being the manufacturer eligible for responsibility on additional damages or costs. .

1.16 Installation precautions

Risk of electrical shock. Instrument terminals can be connected to dangerous voltage.

Instrument protected with double isolation. No earth connection required.

Instrument is in conformity with CE rules and regulations. See "CE Declaration of Conformity" further in this document.

This instrument has been designed and verified according to the 61010-1 CE security regulation, and is designed for applications on industrial environments. See the "CE Declaration of Conformity" further in this document for information on the category of measure and the degree of pollution levels that apply.

Installation of this instrument must be performed by qualified personnel only. This manual contains the appropriate information for the installation. Using the instrument in ways not specified by the manufacturer may lead to a reduction on the specified protection level. Disconnect the instrument from power before starting any maintenance and / or installation action.

The instrument does not have a general switch and will start operation as soon as power is connected. The instrument does not have protection fuse, the fuse must be added during installation.

The instrument is designed to be panel mounted. An appropriate ventilation of the instrument must be assured. Do not expose the instrument to excess of humidity. Maintain clean by using a humid rag and do NOT use abrasive products such as alcohols, solvents, etc.

General recommendations for electrical installations apply, and for proper functionality we recommend : if possible, install the instrument far from electrical noise or magnetic field generators such as power relays, electrical motors, speed variators, ... If possible, do not install along the same conduits power cables (power, motor controllers, electrovalves, ...) together with signal and/or control cables.

Before proceeding to the power connection, verify that the voltage level available matches the power levels indicated in the label on the instrument.

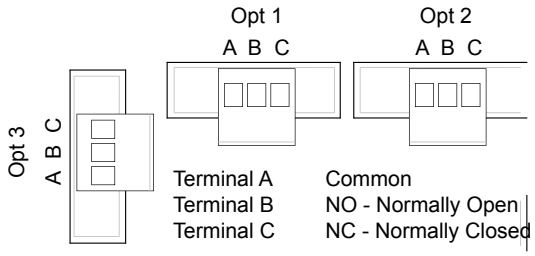
In case of fire, disconnect the instrument from the power line, fire alarm according to local rules, disconnect the air conditioning, attack fire with carbonic snow, never with water.

2. Control modules

2.1 Module R

Module with 1 relay. Up to a maximum of three R modules can be installed in one Q-DISP panel meter.

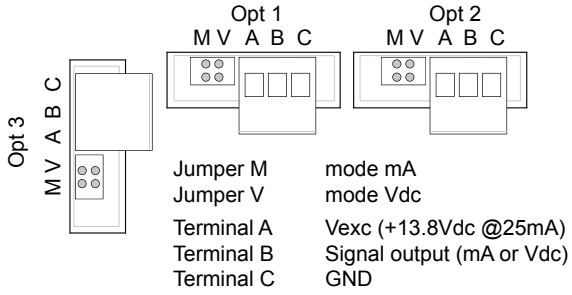
Relay type	3 contacts (Common, NC, NO)
Maximum current	8A (resistive load)
Voltage	250 Vac continuously
Installable at	Option1 and/or Option2 and/or Option3

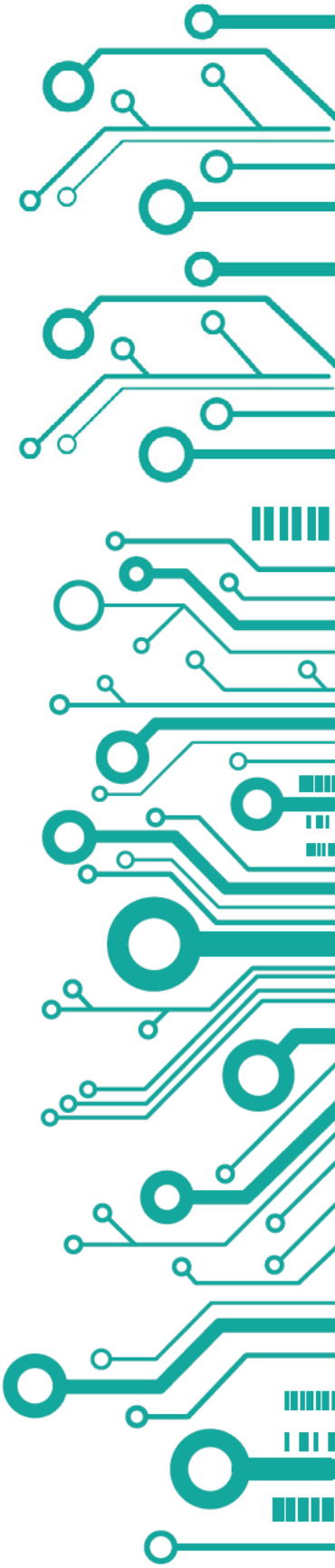


2.2 Module AO

Module with 1 analogue output. Configurable 4/20mA or 0/10Vdc. Output signal proportional to the reading. Scaling through the frontal keypad. Up to a maximum of three AO modules can be installed in one Q-DISP panel meter.

Output	4/20mA, 0/10Vdc selectable
Accuracy	0.1% FS
Isolated	yes, 1000Vdc
Thermal drift	50 ppm/ºC for Vdc 60 ppm/ºC for mA
Installable at	Option1 and/or Option2 and/or Option3





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